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Redesigning the Energy Sector: Co-Creating New Business Models

ABSTRACT

This study examines the role of design in creating multi-stakeholder business models.

An essential goal for the energy sector is a complete conversion to sustainable energy; however, this sector is characterized by fragmented clusters competing for subsidies who sub-optimize their individual business models.

The case study used is based on a concern for the energy sector with the following research question: How can we design a business model that will enable actors across industries to exploit shared synergies for a greater good?

The article discusses findings from an action research initiative in the energy sector aimed at designing and developing co-created cross-sector business models using a strategic visualization design vehicle.

The findings highlight how designing shared business models can play an active role in building the foundation for transforming traditional business models into co-created multi-stakeholder business models. The case study shows how strategic visualization can become a design vehicle by creating clarity for those involved, as

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well as initiating communication across the actor landscape and building shared engagement platforms.

NEW BUSINESS MODELS AND CHANGING ROLES FOR DESIGN

Business models are fundamentally changing nowadays. Consequently, the role of design in creating business value is undergoing a fundamental change as well.

Both private and public corporations experience the ways in which focus is changing from products and services to a much stronger focus on addressing challenges that are too complex and massive for any one corporation to address by itself. At the same time, the centre of value creation for the corporation is moving from being primarily an internal concern (in which the corporation's internal resources are substantial) to developing and producing its own products and services. New business models include a much higher degree of external engagement, in which the customer, citizen, patient and client can co-create solutions.

But what are the consequences of these new business models for design? And how can design contribute to further developing future business models going forward? In the following, we will take a closer look at the development in business models and the changing dynamics of the way we conduct business, as well as how both are linked with the changing role of design.

FROM CLASSIC BUSINESS MODELS TO NEW BUSINESS MODELS

In the past few decades, we have seen a shift from classic business models centred around product offerings towards customer-centric business models. Recently, we are seeing yet another shift to new business models that are built around complex and massive challenges that are too vast for any one corporation (or even a few) to address by themselves.

Product-Centric Business Models

Classic business models still dominate the contemporary business world, and are centred around delivering products and services from the manufacturer to the customer. As described by Porter and Heppelmann (2014), business models 'have traditionally focused on producing a physical good and capturing

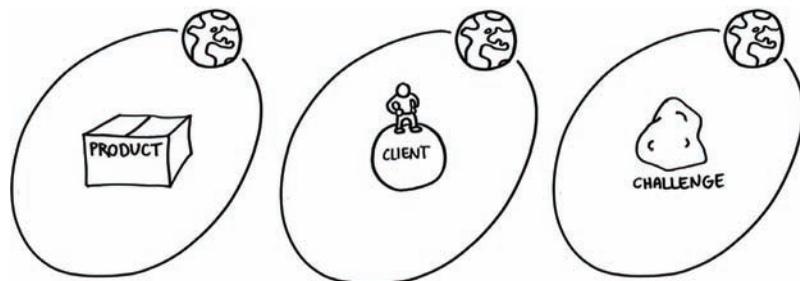


Figure 1: Paradigms of business models: from the product being at the centre of the universe to the client being at the centre. The challenge itself now lies at the centre (source: Rex Degnegaard).

value by transferring ownership of the good to the customer through a sales transaction’.

The role of design in classic business models is primarily internally oriented, with a focus on long-term strategy. The perception that strategy can be designed as a prescription for the corporation’s future has a long-standing tradition, starting as early as the 1960s. Mintzberg, Lampel and Ahlstrand (1998) describe the connection between business strategy and design (and its influence on strategy) by using the term ‘the design school’ of strategy. The design school is described as the most influential school of strategy, and ‘contains some of the most deeply seated assumptions about strategic management’ (Mintzberg, Lampel and Ahlstrand, 1998). In the design school of strategy, strategy formation is prescriptive in nature: its purpose is to find a ‘fit’ between internal capabilities and external possibilities. Thus, in this sense, ‘design’ is another term for the analytical perspective.

This traditional role for design is focused on analytical perspectives without regard to what Roger Martin (2008) has described as ‘intuitive thinking’. In Martin’s work on ‘the design of business’, he lays out a perspective for design that combines analytical thinking and intuitive thinking, in which his conceptualization of ‘design thinking’ plays a central role in newer business models (as will be seen in the following).

An essential premise of traditional business models is that products, strategies and business models can be perfected by focused analysis, and then implemented with success without regard to relational dynamics, as can be seen in customer-centric business models.

Customer-Centric Business Models

Over the course of the past few centuries, business models have transitioned from being product-centric to customer-centric. This becomes evident when considering the intense focus on companies who emphasize service in their solutions, or who apply needs-based analyses, self-service solutions, citizen involvement, etc. These tendencies are seen in both private and public institutions that pull towards a service focus that evolves around the customer, citizen, user, patient or client.

Along with customer-centric business models, there is a distinct focus on product development that employs the help of the customer or user as co-developer, co-designer and co-creator. Customer-centric business models engage co-creation processes and crowd-sourcing approaches to develop new solutions for the customer.

The changing role of design in these customer-centric business models evolves around building an understanding of customers’ needs, wants and wishes on the one hand, and linking the company’s capabilities with external customer needs to ensure customer value delivery on the other.

In terms of ensuring customer value creation and delivery in customer-centric business models, design has had a great impact on business in terms of design thinking, service design, experience design, etc. These newer design disciplines build on user-centric design perspectives that were framed by Donald Norman in *The design of everyday things* (1988). These essential perspectives on user-centric design are at the core of both the newer design disciplines and customer-centric business models (Degnegaard, 2014).

Given that customer-centric business models are centred around customer value creation means they are also focused on value creation for its targeted

1. Global pharmaceutical company Novo Nordisk, for example, launched 'Cities Changing Diabetes' in 2014, a multi-stakeholder initiative for promoting health in cities.

customers. However, as a business model, this approach is limited when it comes to designing value creation for a purpose that is larger than that. Business models that target challenges at a higher systemic level than value creation for customers include the new business models that set new horizons, new demands and new opportunities for design in business.

Challenge-Centric Business Models

The modern world is changing in terms of business models. Contemporary changes pull companies towards business models that are centred around large-scale challenges, such as safety and security, health, sustainability, education, etc.

Private and public organizations are beginning to tackle challenges that are too complex and massive for any one organization to successfully address by itself; for example, pharmaceutical companies are currently moving away from a one-sided focus on development and marketing of specific drugs towards working at a broader level with treatment areas, the inclusion of patients and illness prevention.¹ Another example is the ways in which the Danish police are expanding their agenda for cross-sector collaboration, targeting large-scale challenges such as vulnerable neighbourhoods, traveling gangs of foreign criminals and safer nightlife. These are all challenges that reach far beyond the organizations' reach and scope; moreover, they require organizational design and methodologies that can engage multiple stakeholders.

When corporations step beyond their internal focus to include external stakeholders, they call out for new business models based on co-creation approaches. As such, the role of design becomes central in co-creating these new business models – both in relation to designing processes for unfolding the potential of these multi-stakeholder initiatives (Degnegaard, 2014; Degnegaard, Degnegaard and Coughlan, 2015), and in creating engagement platforms in difference spaces and parts of the ecosystem (Ramaswamy and Ozan, 2014).

NEW BUSINESS MODELS – NEW DESIGN PRINCIPLES

The above-mentioned transitions from traditional product-centric business models, across customer-centric business models, to new business models centred around challenges are accompanied by a fundamental shift in design principles.

Values are core to design principles; this is the case both when designing for everyday things (Norman, 1988), as well as when designing for business. When considering the transition from traditional business models to new business models, the espoused values are changing fundamentally. And with changes in espoused values follow changes in action and models for action (Agyris and Schön, 1978).

Old Power

Heimans and Timms (2014) describe this as 'new power models vs. old power models'. According to them, it is not the case that the old models are no longer distinct and therefore being taken over by new models, but rather that there is a growing tension between the two. Old power is explicit, discrete and elitarian: 'Old power works like a currency. It is held by few. Once gained, it is jealously guarded, and the powerful have a substantial

store of it to spend. It is closed, inaccessible, and leader-drive. It downloads, and it captures' (Heimans and Timms, 2014).

When considering traditional business models, it becomes clear that they are based on old power, with their focus on internal resource perspectives. These perspectives are analysed internally, are based on centrally held decision processes and efficiency approaches, and possess performance systems based on internal managerial measures and targets. When translated to design principles for business, these old power values can be seen as analytical, elitarian design approaches. They represent the same perspectives for design as those highlighted by Sanders and Stappers (2008), who suggested the term 'designing of' as opposed to 'designing for'.

New Power

Conversely, new power is embedded, transparent and open:

New power operates differently, like a current. It is made by many. It is open, participatory, and peer-driven. It uploads, and it distributes. Like water or electricity, it's most forceful when it surges. The goal with new power is not to hoard it but to channel it.

(Heimans and Timms, 2014)

When relating the different business models to power, it appears that the new business models – with their attention on the external, a much higher degree of focus on relational dynamics and constant development – are based on new power values more than traditional business models.

The transition from product-centric business models to customer-centric business models entails a shift from old power towards new power. Furthermore, the transition from customer-centric business models towards challenge-centric business models provide a deeper toning of this same tendency.

Translating these new power values to design principles for business highlights their transparency, engagement and inclusion – principles that are parallel to the co-creation perspectives of Prahalad and Ramaswamy (2004a; 2004b), as formulated as co-creation building blocks in their DART model (Dialogue, Access, Risk assessment, Transparency) (Ramaswamy and Ozan, 2014).

The resemblance between marketing's early co-creation perspectives and the design principles of new power models is furthered by its focus on engagement. Engagement as a primary design function is central to the new business model trajectory (Degnegaard, 2014; Degnegaard, Degnegaard and Coughlan, 2015), as well as in the co-creation trajectory furthered by Ramaswamy and Ozan (2014).

Design perspectives in new business models that are based on new power values set an approach for design as 'designing for' (Sanders and Stappers, 2008) – i.e. designing for customer value creation, designing for large-scale challenges, etc.

BUILDING COMPETITIVE BUSINESS ADVANTAGE IN A NEW COMPLEX LANDSCAPE

As business models change, so does the competitive landscape. Technology has resulted in a massive increase in the data that is available for customers and decision-makers (McKinsey Global Institute 2012). Organizations experience increasing demands from customers, clients and citizens, who are more

informed and educated about their own needs and wants than ever before. Decision-makers in organizations across industries and sectors experience an equally massive increase in the data that is available to them (Pralhad and Ramaswamy, 2004a; Prahalad and Ramaswamy, 2004b). Technology is enabling greater transparency and the possibility for organizations to engage with customers, and vice versa. The newest technological trend of the Internet of Things will further fuel the demand for connectivity between products, people and ultimately industries (Porter and Heppelmann, 2014).

The competitive landscape is also being affected in multiple ways by increased globalization. Economic and political decisions no longer stay within national borders, but can affect markets in global ripples, thereby causing increased strategic discontinuities and blurring industry boundaries (Hitt, Keats and DeMarie, 1998).

The creation of competitive business advantage as an imperative objective for companies to survive is therefore also changing. Old power competition has been viewed as a condition between peer competitors: 'If one competitor increases the value it delivers, it raises the hurdle for all other competitors' (Campbell and Alexander, 1997). Furthermore, the search for, and understanding of, competitive advantage has mainly been seen as an internal exercise in examining the organization's own resources, strategy and organizational capabilities, as well as in analysing the surrounding environment from an inside-out perspective (Ulrich and Lake, 1991; Barney, 1995).

As such, competition in contemporary business models is moving into new dimensions, with new boundaries and new opportunities. Traditional business models had clear distinctions between competitors and collaborators. Being able to identify who were competitors and who were partners for the organization (and labelling them as either good or bad) created a strong lever for building corporate identity and setting clear strategic targets. However, in today's business models, we see companies acting as competitors in the morning and as collaborators in the afternoon. Solutions are not solely based on what one company can deliver. As a result, the ability to create multi-stakeholder platforms for creating shared value is becoming essential in today's business models (Pralhad and Ramaswamy, 2004a; Prahalad and Ramaswamy, 2004b; Degnegaard, 2014; Ramaswamy and Ozan, 2014).

COMPETITIVE BUSINESS ADVANTAGE IN THE ENERGY SECTOR

With this changing landscape of competition as its backdrop, the energy sector is the focus of the current study. If we take a short historic view of the energy sector from a European perspective, we see how a monopolistic energy sector rose in 1970s from a political agenda of supply security that itself sprung from the era's energy crisis. In the mid-1990s, the monopolies were gradually outpaced due to political winds of change that moved towards increased competition as a way of renewing the sector and securing the best prices for consumers (Olsen, 1996). This meant separating the energy sector's production and trade from distribution; in other words, dividing the monopolistic value chain into autonomous actors to compete on market terms, albeit in a regulated market (Elbæk, 2014; Nielsen, 2014). Since then, a fossil-free agenda took over the political scene in the middle of the 2000s, which has caused, among other things, the subsidizing of green alternatives so as to make them competitively attractive.

In this gradually transforming energy sector, we can focus further on the central player in the current case, Energinet. Energinet is an independent, state-owned organization that owns infrastructure in gas and electricity in Denmark. The gas storage division is an autonomous part of Energinet in the sense that it runs a business on market terms, storing large-scale quantities of natural gas for industrial clients. An endless stream of natural gas in the pipes has until now made the gas storage division's need for building competitive advantage somewhat redundant. Hans-Åge Nielsen, chief consultant of the gas storage division, describes the state of the gas sector in the following way: 'We have been the sleeping beauty of the energy sector' (Nielsen, 2014).

In the past five years, the fossil-free agenda has superseded the political scene, questioning the very existence of natural gas as a supplement to future energy consumption. Building competitive business advantage for the gas storage division is therefore no longer a question of evaluating assets and competing on parameters such as price, flexibility, capabilities and technological knowledge. The operating landscape is changing as a whole: the fossil-free agenda is fundamentally changing the scene for production, distribution and use of natural gas.

The gas storage division is now in search of competitive business advantage in order to secure the demand for their future gas storage capacity, to be continuously profitable and, preferably, to be free of regulatory support. However, the gas storage division is also subsumed to the overall strategy and strategic decisions of the mother company, Energinet, which is obligated to reflect the energy policy of the Danish government. As such, the gas storage division has a built-in schizophrenic dilemma between serving its own need for building business competitive advantage and complying with a governmental strategy where competitive advantage is not necessarily the central goal.

This challenge is substantial. The government's goal has been set for a full conversion to renewable energy by 2050; for that to happen, each player in the energy sector will eventually have to play a part. But how is the gas storage division to play a role in this conversion, given that it is only one link in a fossil value chain? Being the owner of storage capacity, it is self-evident that there is a strong dependency on others (i.e. producers and consumers) to pull in the same direction if they are to succeed with the green part of their strategy.

The strategic solution to the green challenge was that the gas storage division was asked to 'do something green' by Energinet (Energinet.dk, 2012; Elbæk, 2014). 'Something green' meant creating demonstration projects:² isolated, microcosmic showcases with the purpose of convincing other players in the value chain (i.e. large industrial actors) that the conversion could be completed, and that they 'should take it from there and make it happen large-scale' (Elbæk, 2014). The demonstration projects were conducted with the intention of creating a snowball effect:

It didn't work in practice. If a company like ours (trading with fossil gas) should do something green and be credible at the same time, it required more than just putting a green sticker on it. We did make a demonstration project and others wouldn't even invite us to the table. Going green is the right thing to do. But our strategy for it was wrong.

(Elbæk, 2014)

2. A demonstration project could include adding biogas to the natural gas pipes to expand the volume of renewable gas (Elbæk, 2014).

CASE DESCRIPTION

The gas storage division created a vision of an integrated energy sector – with (green) gas storage as a central element. Their vision was thoroughly defined in the form of text, a visual model (Figure 2) and film, showing how gas storage can play a central role in a future integrated energy sector that aims at larger quantities of green electricity. Up until this point, a central technological challenge has been the inability to store electricity on a large scale. That is no longer the case. Technological advancements have made conversion of green electricity to gas through large-scale electrolysis systems possible, meaning green energy can be stored for later use in the form of gas, or converted back into electricity.

However, the vision turned out to be a Gordian knot business-wise. Gas storage is just one piece of the puzzle; a viable and feasible business model would therefore require a fully functioning value chain, including everything from production, conversion, distribution and consumption. Without a large-scale green value chain there would be no need for green gas storage capacity. Considering the scale of the gas storage capacity (a single cavern can fit several Eiffel Towers stacked on top of each other), a small production facility and a few hydrogen car fleets would not be enough. In order to be viable, solutions needed to be society-wide. The question was: Where do you start when the aim is to construct such a large-scale value chain? CEO, Adam Elbæk describes their concerns as follows: ‘We were able to see what *had* to happen, but we couldn’t *make* it happen. We own only one or two of the links in the value chain. Not the ones before and not the ones after’ (Elbæk 2014).

In other words, unfolding this potential would require a coordinated effort across multiple diverse stakeholders in a competitive and fragmented energy sector.

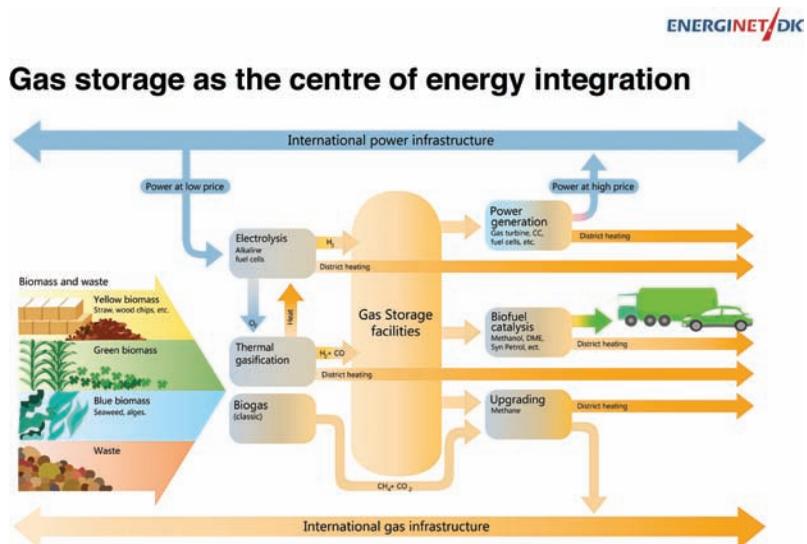


Figure 2: The visual representation of the gas storage division’s vision (source: Energinet).

METHODOLOGY, RESEARCH TEAM AND DATA GENERATION

The study is based on an empirical energy sector case and uses an action research approach. The action research format has been greatly inspired by Kurt Lewin's (1946, p.38) circular framework: 'A circle of planning, execution, and reconnaissance or fact-finding for the purpose of evaluating the results of the second step, for preparing the rational basis of the third step and perhaps modifying again the overall plan'.

The reasons for conducting action research in the current study are twofold. The first reason is that it was a wish and a requirement from the case owner. This is a real-life case in which the gas storage division has worked with the researchers to develop methodologies that can help them develop their business. As such, it has been essential to include concrete actions that explore opportunities and challenges with the case owner. The nature of this research is not to conduct research based on historic actions or to apply available research-based knowledge to a different empirical setting. Rather, research and case development have gone together like walking on two feet: action research – with its numerous iterations of research preparation and hypothesis building – is followed by empirical intervention, which then leads to shared hypothesis building with case owners, then research, again followed by hypothesis building, and so on.

The second reason for conducting action research is that the dynamic nature in the field of co-creating multi-stakeholder business models using strategic visualization as a co-design vehicle simply does not lend itself to be studied in chambers. The topic necessitates a focus on the relational dynamics of the multi-disciplinary which requires an ethnographically inspired approach that allows for emergence. The strict nature of action research (as put forth traditionally with pre-established focus groups, pre-defined stages, etc.) can therefore not be fulfilled in the current research project (Chisholm and Elden, 1993). Furthermore, developing strategic visualization as a co-design vehicle for multi-stakeholder business models cannot be abstracted to theoretical or hypothetical analyses.

TYPES OF SITES FOR DATA GENERATION/DATA COLLECTION

In the current study the sites for data generation/data collection include the following:

Planning Meetings

Planning meetings take place prior to a meeting with external stakeholders. In these meetings, the team of researchers/consultants meet with case owners to plan and prepare.

The nature of the planning meetings varies from workshops where ideas are tested, visually mapped out, discarded and recreated, to team huddles where the aim is to align expectations, evaluate the situation and modify the plan (if needed).

Engagement Meetings

Engagement meetings are where the planned ideas and strategies are executed. The participants are external stakeholders, case owners and researchers/consultants.

In this co-creation-specific setting, engagement meetings are either meetings on possible synergies, co-creation meetings or commitment meetings.

During meetings on possible synergies, the value potential for, and possible contributions from, each stakeholder are mapped out and discussed. In the co-creation meetings, the shared business model is co-designed and an action plan is created. In commitment meetings, the participants follow up on the action plan, and evaluate and modify the overall plan.

Evaluation Meetings

Evaluation meetings are where case owners and researchers/consultants evaluate the engagement meeting for four reasons: (1) to create a mutual understanding of what took place; (2) to evaluate new insights and challenges that emerged at the meeting; (3) to identify important elements to go into the next planning meeting; and (4) to evaluate if the overall initiative is still on course.

Interviews

Interviews are additions to the circular action research approach. Interviews are conducted with case owners on a biannual basis to get an overall view of the co-creation initiative. These interviews can be in a traditional format (i.e. recorded interviews on a one-to-one basis, stretching from 30–50 minutes long) or visually facilitated interviews without an interview protocol, with a duration of two to three hours.

THE ACTION RESEARCH TEAM

The action research team working on this case consists of an interdisciplinary team of researchers, advisors and case owners. The interdisciplinary can at times be seen as generic professionals who embrace several disciplines once. However, in this sense, interdisciplinary means a team consisting of professionals with deep specialized expertise, knowledge and experience within their own disciplines. The team has been brought together to work on the project, closely knitting these disciplines to target the highly complex and cross-disciplinary challenges of the case. Expertise in co-creation and large-scale transformation was brought to the table from a research-based advisory standpoint. Strategic visualization and experience in designing multi-stakeholder initiatives were mainly brought into the team via the first author of this article, Stine Degnegaard. In-depth knowledge and understanding of engineering-related technologies and rock mechanics, thermodynamics and process technology were made available to the team from the case owners, along with experienced and competent knowledge of the industry and business, a deep market knowledge, and an understanding of regulations and pricing structures.

DATA GENERATION

In the current study, the nature of the case has required a methodological approach to data that suggests a shift from a traditional data collection approach to that of a data generation approach. The transformational nature of the case and its development focus does not allow for a data collection approach, in which the already available data can be collected like collecting mushrooms in a forest. In the current case, data has been generated via the action research team.

Understanding the dual role of the researchers in the case study as both researchers and advisors is important for understanding the conditions of the data generation. Given the novelty of the solution, the explorative nature of

the case calls for a mutually open-minded and explorative approach shared by the case owners and researchers. This has resulted in many iterations of evaluating previous actions, understanding the current situation, setting future scenarios and settling on the next moves in the process, as well as generating ideas for what might work and prototyping them in a collaborative setting, etc. In this explorative process, desired outcomes have been designed and have emerged during the process as a result of continuous iterations of setting a future trajectory, as well as acting upon, evaluating and adjusting a continued collaborative interdisciplinary development process. This process has required willingness on the case owners' and researchers' part to explore what initially appeared to be detours. This meant taking a leap of faith based on the knowledge available at the time, and generating data to be able to move ahead into parts of the process that could not have been designed at an earlier stage.

On the other hand, the nature of the case meant the gas storage division could not afford to miss an opportunity. The case study was not a closed experiment, but a real-life, strategically important initiative with a high level of risk, and an extreme value potential for the case owners, partners and society. Careful considerations of both strategizing and strategic visualization were made, and great vigilance was exercised to accommodate contextual factors. This included not contradicting the overall strategy of the mother company while creating strategic new paths; approaching potential partners who would traditionally see themselves as competitors; and being receptive and accommodating towards other perspectives not necessarily shared by the case owner.

TYPES OF DATA

The type of data generated in the study reflects the complexity and multi-dimensional nature of the case. The data has been collected through different sites, using multi-sited ethnographic research (Marcus, 1995). Below is a specification of the different sites of data.

Unique Strategic Visualizations as Process Vehicle

Co-created, sketchy notes drawn on blank sheets of paper in meetings and workshops.

Generic Strategic Visual Process Tools

Pre-developed visual templates with blank spaces for text to be inserted. They acted as process vehicles in workshops, with case owner and other stakeholders using them to co-design shared business models.

Unique Strategic Visualizations as End Products

These were created on the basis of input in terms of feedback and synthesis from strategic visualizations. These can be described as aesthetically coherent visual narratives for the shared business models.

Interview Protocols and Interviews Transcripts

Retrospectively conducted and transcribed interviews with the case owners. The interview protocols have been developed with specific foci: namely the use of strategic visualization as process, communication and engagement tools; the co-creation mindset and methodology; and the process itself, divided into the analysis phase, communication phase and engagement meetings.

3. A specific article on this co-creation analysis method is under development, and will therefore not be described in depth in this article.

Field Notes

The authors' own notes, described as field notes created during or after meetings. These notes reflect both technical and business-related issues discussed by the meeting participants, mixed with the author's own thoughts. These handwritten notes have been transcribed and filed together with images of the notebook pages.

CONCEPTS: CO-CREATION AND STRATEGIC VISUALIZATION

The current study applies a number of concepts that could risk an arbitrary perception. A consequence of this could be that they become ambiguous and therefore do not function as concepts (Koselleck, 1982). In this study, the relevant concepts are co-creation and strategic visualization. In the following section, these two concepts will be subject to a specification to act with a degree of precision so that they can support the analysis in the current study.

Co-Creation

Co-creation as a field has experienced a tremendous growth in the last 10–15 years time (Degnegaard, 2014; Ramaswamy and Ozan, 2014). The co-creation approach engages users/customers/consumers in co-designing the product or process, and is created to encompass a vast amount of complexity in multi-stakeholder processes. The approach is designed to work with problem-solving in an evolving and dynamic way, adapting to the ever-changing reality of organizations.

However, research in co-creating solutions to challenges, rather than products and services for consumers, is scarce. The authors of this article are currently developing, researching and refining a co-creation analysis methodology and framework for a more systematic approach to co-creation analysis (see Figure 3).³ The co-creation analysis model is a process for identifying the value potential for a co-creation initiative, and consists of

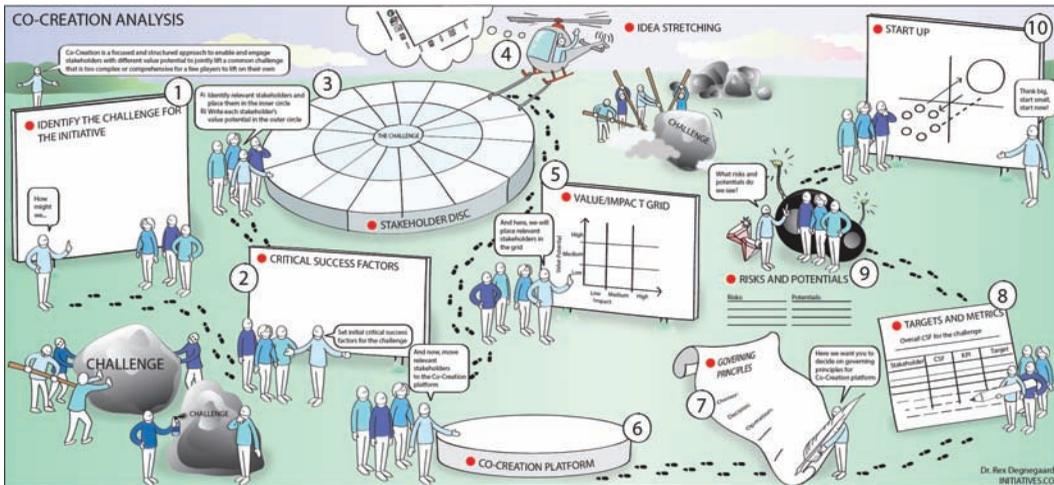


Figure 3: Co-creation analysis method (source: Rex Degnegaard, Stine Degnegaard).

the following steps: (1) identifying the shared challenge; (2) setting critical success factors; (3) identifying stakeholders; (4) idea stretching (i.e. expanding stakeholder groups in terms of numbers and categories); (5) mapping value potential and potential impact for each stakeholder; (6) moving relevant stakeholders to a co-creation platform; (7) defining governing principles; (8) defining targets and metrics; (9) defining risk and potentials; and (10) identifying minor initiatives that are able to pull in the direction of a shared vision.

Strategic Visualization

Strategic visualization is the use of large-scale imagery for a strategic purpose (Degnegaard, Degnegaard and Coughlan, 2015), and has been used in this research study as a design vehicle for creating clarity, discovering obstacles and creating a co-creation business model throughout the initiative.

In this study, these strategic visualizations were made through processes like the one shown in Figure 4. During the design workshops, large, blank papers (1m x 5m) were mounted on the wall. The first author of this article facilitated the meetings by asking numerous questions and visualizing the responses. The visualizations were conducted in a sketchy style which meant they were unfinished and indicative, rather than portraying the subject matter precisely (see Figure 4). This was followed by a draft period where the researcher created syntheses of the many inputs, selected and mapped content into a coherent visual narrative; this in turn was followed by a presentation of the draft and a shared refinement of strategic visualization, and finalized in the last phase by the researcher. The style gradually became more intentional and the hand drawings slowed down to become more accurate.

The end results are either closed strategic visualizations characterized by their immediate visual completeness, often with the purpose of being a communication tool; or the semi-closed strategic visualizations characterized by their visual incompleteness, often with the purpose of serving as an engagement tool.

Strategic visualization can be seen as a manifestation of a design approach that allows for dynamic and open problem-solving processes (Boland and Collopy, 2006) that strive towards the best possible solution, allowing collaborative processes in which we are all co-designers (Moggridge, 2006). The experience of the user, customer or client is at the centre of the process, which again is literally reflected in the strategic visualization through figures acting,

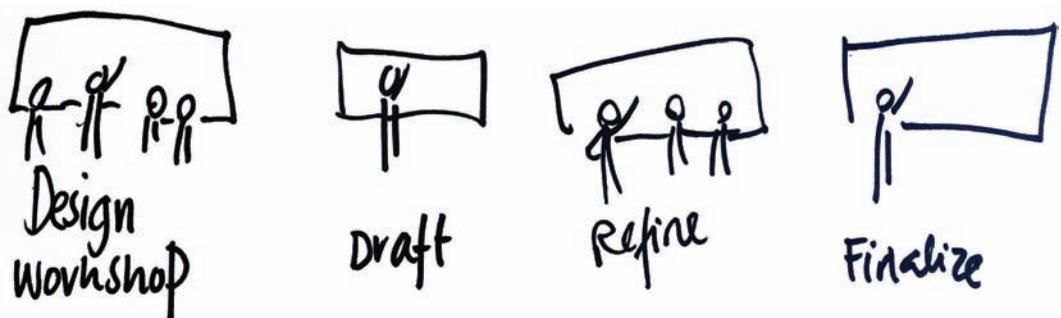


Figure 4: Illustration of the process of strategic visualization (source: Stine Degnegaard).

talking and thinking, giving the human-centric approach both a literal and metaphorical meaning.

ANALYSIS: CO-CREATING A SHARED MULTI-STAKEHOLDER BUSINESS MODEL THROUGH STRATEGIC VISUALIZATION

The current study is conducted in an action-oriented manner by not separating the process from its analytical considerations. Consequently, this analysis section requires the same mutual inclusion of process and analysis. It will therefore contain both process description and analysis.

The analysis is structured in three sections, each referring to the three identified phases of the co-creation process: (1) the clarification phase; (2) the communication phase; and (3) the engagement phase. Figure 5 is a visual representation of the co-creation process so far, and a collection of the central strategic visualizations used throughout the process.

1. THE CLARIFICATION PHASE

The Gordian knot of the gas storage division's vision initiated the collaborative effort. Several meetings and design workshops were conducted with the purpose of understanding the problem, as well as to visually map out the issues at hand. The initial problem formulation – how do we get the others to do what we want them to do? – had a built-in impossibility, which was also reflected in the initial visual model of their vision: 'We had drawn ourselves in the middle, right. And others would probably have done the same. But we needed to make space for others – and that was a very visual thing' (Nielsen, 2014) (see Figure 2).

The first part of the process was to reframe the impossible problem formulation in order to make space for the others. Using the aforementioned co-creation analysis framework (Figure 6), the gas storage division was guided through the ten-step co-creation analysis process, thereby leading to an expanded and more inviting problem formulation: 'How might we create a coherent energy supply by exploiting synergies among relevant stakeholders in the field, with the aim of creating a bigger share of renewable energy, while also taking the maintenance and development of social welfare into account?' This was subsequently altered to 'How might we enable conversion to renewable energy by harnessing synergies across actors in the energy sector?' (Figure 11).

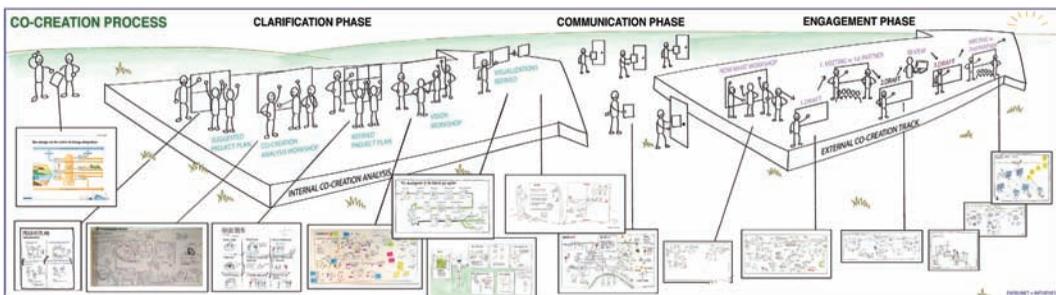
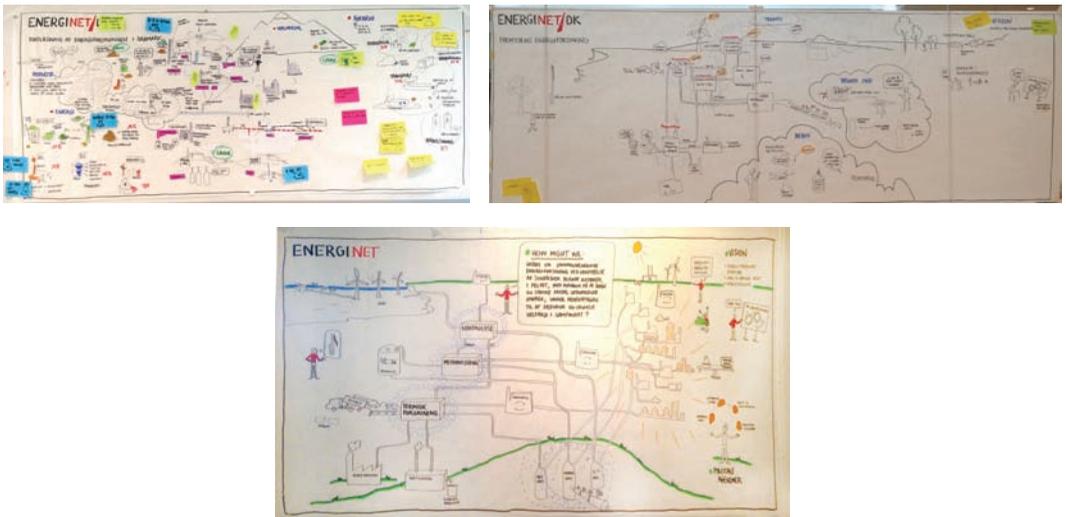


Figure 5: Illustration of the co-creation process. The first arrow symbolizes the clarification phase; the space between the arrows symbolizes the communication phase (opening doors); and the second arrow symbolizes the engagement phase (source: Stine Degnegaard).



Figures 12–14: Thumbnail images to illustrate how the final development of the vision was a product of several iterations.

other actors, the vision and the contextual elements (Figure 11). The expanded vision now took centre stage (the speech bubble), while public and private actors, politicians and customers (the stakeholders) were placed around it.

The Role of Design – Reframing

Design played several roles in this first step. First of all, reframing can be seen as a design tool that can help participants who are stuck to discover new ideas and possibilities. According to Clark (1977, p.840), ‘[reframing] is a way to alter a person’s view point by placing a situation in a different “frame” which changes the meaning of the observed situation’. The frame that was replaced was that of a business model seen from the gas storage division’s viewpoint (‘How can we get others to pull in our direction?’) to a business model seen from the viewpoint of the energy sector as a whole (‘How can we as players in the energy sector pull in the same direction?’).

The Role of Design – Creating Certainty

Strategic visualization as a design tool at this step provides certainty in a process with an uncertain output. The semi-closed strategic visualizations (the co-creation analysis template [Figure 6], with clear steps and blank spaces to be filled out) can allow ‘participants to manage their discomfort of uncertainty during what is often seen and felt as a chaotic process’ (Degnegaard, Degnegaard and Coughlan, 2015). In other words, entering a co-creation analysis process might seem overwhelming at first when leaving the realms of the known, and when ‘being forced to see the challenge as significantly bigger than before’ (Nielsen, 2014). Nevertheless, the semi-closed strategic visualization allowed participants to ‘know that there is a beginning, middle, and end to the process, that it has been done before, and that the facilitators have a detailed plan for how they will support participants to achieve the goal of coming up with novel solutions’ (Degnegaard, Degnegaard and Coughlan,

4. Placement can be considered here as the act of putting something in a particular place and/or regrouping known elements in new contextual arrangements.
5. It was not a phase in the sense of having a clear beginning and an ending, but rather a fluent outreach started during the co-creation analysis phase (which is still ongoing).

2015). As the CEO, Adam Elbæk, described the process, ‘The challenge was confusing but the visual process tools worked like an agenda for us. We could see the blanks to fill out and that was a relief’.

The Role of Design – Placement

In redefining the vision, strategic visualization worked as a tool for placing all elements into one story. However, this had to be coherent in order to work: ‘There is nothing in this visualization that wasn’t in our heads to begin with. It was just messy in our heads. Now they had to fit into the same frame which forced us to look at all the topics and problems next to each other’, Hans-Åge Nielsen said (Nielsen, 2014). The coherency was not there to begin with; fragmented issues and topics were forced into the evolving coherence of the visual that served as a foundation for developing a reframing of the challenges. In his article ‘Wicked problems in design thinking’ (1992), Richard Buchanan unfolds the doctrine of placement⁴ as a tool for the designer: ‘Placements are the tools by which a designer intuitively or deliberately shapes a design situation, identifying the views of all participants, the issues which concerns them and the invention that will serve as working hypothesis for exploration and development’ (Buchanan, 1992).

2. COMMUNICATION PHASE

Next followed a phase of outreach and communicating to potential co-creation partners.⁵ For this, it seemed obvious to tap into the pre-existing aspects of a hydrogen hub as a lever for unfolding the greater potential. The only obstacle was that the gas storage division had already contacted company X and explained their initial strategy for an integrated energy system prior to embarking on the co-creation journey. They had then been met with a closed door and a statement: ‘We do not wish to talk to competitors’ (Nielsen, 2014). This had left them discouraged and frustrated.

Now though, armed with the new strategic visualization of the vision, the chief consultant of the gas division, Hans-Åge Nielsen, had renewed hopes for opening the doors of that important stakeholder. He attended an international conference on gas storage, which he anticipated would be attended by a delegate from company X. The delegate was indeed at the conference and was soon interested to see what the gas storage division had brought. This time he unfolded the strategic visualization, which showed:

[...] what we were able to bring to the table that we imagined company X did not have. And as the other partners, we imagined, also did not have. The visual showed the direction for our conversation and had space enough for us to continue the drawing.

(Nielsen, 2014)

The delegates from company X went ‘back to his headquarter in [country X] and said “We might have turned them down before, but it turns out that the business model that they envision, this is the one [the visual] and we believe in it”’ (Elbæk, 2014).

The Role of Design – Conversation Starter

Strategic visualizations as a design tool played different roles in this phase. From a co-creation viewpoint, the strategic visualization represented the

starting point for dialogue, which is one of the four pillars in the DART model of co-creation of value: ‘[Dialogue] implies shared learning and communication between two equal problem solvers’ (Pralhad and Ramaswamy, 2004a; Pralhad and Ramaswamy, 2004b). In the strategic visualization, actors of the vision were illustrated as gears that have to fit together in order to work, thus not making one part more important than the other.

The Role of Design – Engaging Communication

The design tool helped in striking a balance between showing that the gas storage division was well prepared and that a lot of thought had gone into the vision: ‘There is an element of slow food to it [the fact that it was hand-drawn]. A real human being has produced this and that makes it appetizing. People want to engage with it’ (Elbæk, 2014). On the other hand, the strategic visualization was not too specific in relation to the execution of the vision.

3. ENGAGEMENT PHASE

The engagement phase started out with a ‘Now What?’ workshop with case owners and researchers. The first important stakeholder had agreed to meet and discuss possibilities, and now the question was how best to proceed. The purpose of the workshop was to evaluate the options for how to take the process further. The mutual assumption was that a new type of strategic visualization was needed for the engagement phase. The concern, however, was that the strategic visualization of the gas storage division’s vision would appear ‘too finished to be inviting’, since it was clear that a lot of work had gone into it and the whole puzzle was laid out in a visually coherent logic. From a co-creation perspective, it became clear that a vision and a process structure was needed to help the co-creation initiative progress further. However, a too rigid vision and process structure would indicate a lack of willingness to fully encompass the other partner into the process. The prototype solution to this challenge was to create a visual template for the meeting (Figure 15).

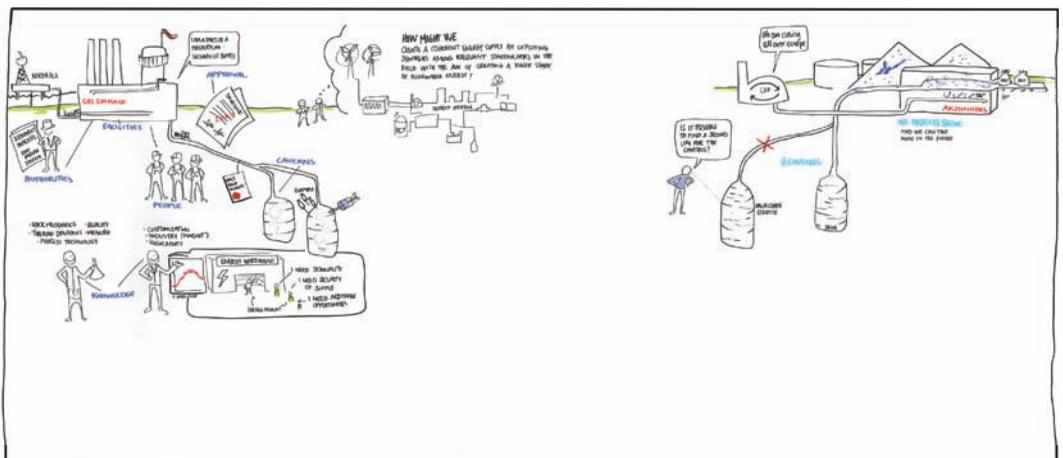


Figure 15: The first prototype for the engagement meeting (source: Rex Degnegaard, Stine Degnegaard).

On the left-hand side, the gas storage division was visually mapped out with the assets that they were able to bring to the co-creation effort. These included specific knowledge (in terms of the scientific/gas market); people with clearance and approval to work with dangerous materials; a 'short' link to authorities and politicians; and large underground caverns. On the right-hand side, a few assumptions of what company X could bring to the co-creation effort were mapped out. And in the top middle of the diagram, the core vision was written in a semi-closed thought bubble, thus leaving room to specify it even further. However, what truly characterized the strategic visualization was the large field of white space.

It was a meeting of great strategic importance. As such, Hans-Åge Nielsen was both nervous and excited:

I was anxious as to what impression we would give and if they would accept this tool. This is a very different tool compared to how we normally work, and I could feel that nervousness in me. But I tried not to let it show.

(Nielsen, 2014)

The meeting went well. The strategic visualization was mounted on the wall before the meeting.

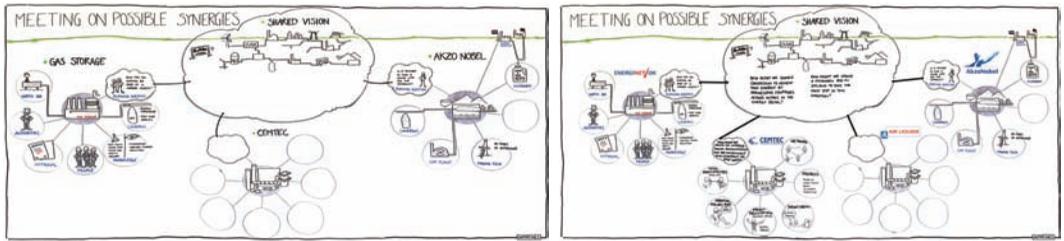
We almost didn't get to sit down before we got up again, and went to the visualization and presented it. We knew exactly what value propositions were important for the project and what role we could play. And after I did that, the consultant X jumped right up and did the same. And then we began to draw what we thought could be done.

(Nielsen, 2014)

As the visual template filled up with visual images from the dialogue, more technical discussions began to surface. At one point, the manager from company X asked the gas storage division questions on a delicate matter – the quality and pressure capacity in the pipes to and from the caverns. Instantly realizing that the question could be seen as a matter of confidentiality, the manager immediately withdrew the question. Hans-Åge Nielsen responded: 'No, we are opening up our business model and we would gladly tell you'. The technical data was subsequently added to the strategic visualization. Later in the conversation, the manager from company X referred back to the incident and said: 'If you can reveal certain matters, so can we'.

At the engagement meeting, other potential stakeholders were also discussed, some of whom had been identified in the co-creation analysis phase and some that company X suggested should be there. A plan was then made to invite a new potential partner to a future engagement meeting.

After the first engagement meeting had ended, preparation went into the next engagement meeting. The prototype of the initial template (Figure 15) founded the basis of the development of the template below (Figures 16 and 17). The template consisted of three simple elements: (1) the vision in the middle; (2) the actors surrounding it; and (3) (surrounding each actor) the assets that each actor will bring. The template to the left was then used for the second engagement meeting, while the template to the right was employed at the third meeting: 'It made the process very clear. We know exactly what to focus on: understanding the new partner in the room by filling



Figures 16–17: Iterated prototype of the template (anonymised) used at the second (left) and third (right) engagement meetings (source: Rex Degnegaard, Stine Degnegaard).

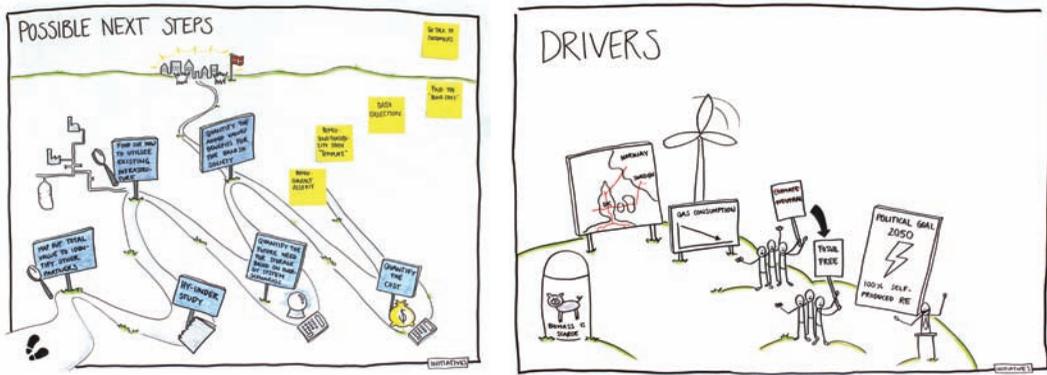
out the blanks’ (company X consultant). The template was therefore replicated by making room for one more partner to share the vision.

The Role of Design – Transparency

In the energy sector, as well as in other sectors dominated by old power values (e.g. exclusivity, competition, authority, confidentiality; cf. Heimans and Timms, 2014), there is a tradition for withholding information. As described in the case study, and as part of the transformation to a new power paradigm, transparency becomes a precondition for co-creation (Prahalad and Ramaswamy, 2004a; Prahalad and Ramaswamy, 2004b). Strategic visualization can therefore play a role in the transparency canvas, whereby different partners can reveal and agree on the boundaries for interaction. Understanding transparency as a canvas on which objects are visually displayed has been examined in an architectural context in ‘Transparency: literal and phenomenal’ by Colin Rowe and Robert Slutzky (1963). They offer a way of understanding transparency as an optical characteristic and a spatial order: the optical characteristic is the ability to portray several objects ‘without an optical disruption of each other’ (Rowe and Slutzky, 1963); while the spatial order is the ability to give ‘a simultaneous perception of different locations’, meaning that one can see some figures as closer than others (Rowe and Slutzky, 1963). Using landscape as a consistent visual metaphor, strategic visualizations offer a structure for placing elements so that the viewers literally see themselves as small figures interacting with each other in a visual model of the project. The visualizations therefore become maps in which the actors can meet each other as equal partners.

The Role of Design – Clear Process Structure

The visual template offered a clear structure for the meetings. The fact that the headlines were mapped out (e.g. ‘Vision’ and ‘Assets we bring’) shortened the conversations among the participants, and helped them from getting lost in technical discussions on the feasibility of the project. As Hans-Åge Nielsen (2014) explains, ‘It’s a highly effective process tool’. However, the visual template also invited the meeting’s participants to co-create new templates, including the notion of working under the constraints of a clear headline and framing a landscape that appealed to the participants. As a chief consultant from company X iterated, ‘I can see that we need a new template. We have to have a “Possible next step” template and a “Drivers” template’ (Figures 18 and 19).



Figures 18–19: Prototype of templates co-created with partners (source: Stine Degnegaard).

This indicates that possessing clarity when working with visual templates not only makes the process and subject matter at hand clear, but can also transfer to process steps and subject matters that are *not* there. Participants see what is missing in relation to what is visually present, thus allowing for co-creation – not only of the content, but also of the actual process.

CONCLUSION

‘Now we know the shape of our piece in the co-creation puzzle [...] it’s not hard for us to know what to look for and who to collaborate with’ (Nielsen, 2014).

The overall learning from the case study is that strategic visualization as a design vehicle can support designing multi-stakeholder business models in three vital areas: (1) creating clarity; (2) helping with communication; and (3) supporting engagement.

Creating Clarity

To begin with, we saw how strategic visualization was able to provide a systemic perspective of the challenge and vision at hand by placing known elements in a spatially ordered landscape. The design-led investigation also resulted in identification of new elements/stakeholders, and thus new value potentials to be placed in the strategic visualization. The clarity of the new competitive landscape revealed the value potentials for other actors, which again led to an expanding of the vision.

Secondly, the clarity of the landscape led to a change in the perception of the gas storage division’s role:

Our roles have changed in the way that we no longer feel that we own the vision. That notion of monopoly of the idea, that’s just not important for us anymore. What is important for us is to be able to have a dialogue with relevant stakeholders in and outside the sector. We need to go outside the sector in order to solve this.

(Elbæk, 2014)

Thirdly, the clarification of the vision meant that the starting point almost revealed itself: ‘I have that visualization in my head all the time. And it was that visualization that made us realize what to focus on. Hydrogen was the key. It has to happen before the other things are possible’ (Nielsen, 2014).

In other words, the strategic visualization enabled the gas storage division to have an overview of the systemic, long-term vision alongside the discrete, short-term initiatives that could pull in the direction of the vision.

Communication

Strategic visualization has enabled the gas storage division to communicate their complex vision in a clear and engaging way:

[Customers] get caught by it. And the visualizations *are* lovely for sure. Then they get a 10 minutes overflight of our vision, that is a fantastic way to communicate. Several of them look at it and say, 'we are thinking the precise same thing' as they are in the value chain too.

(Elbæk, 2014)

In other words, the communication is perceived as delightful, while the ability to convey a complex vision in only a few minutes gives the receiver an opportunity to engage. This has enabled the clients to see themselves in the overall message, eliminating the 'them vs. us' relationship often found between customer and provider. The communication act itself becomes a manifestation of new power values: namely collaboration, transparency, sharing and participation (Heimans and Timms, 2014). The delightfulness of the hand-drawn strategic visualizations has also had its impact:

It draws a lot of attention. A lot of people think it is *very* exciting what we do, and *very* alternative. I think they see us as some kind of strategy hipsters. [Laughing] We are the first to surf the big wave and our colleagues are *very* jealous of us.

(Nielsen, 2014)

The ability to communicate in a clear and engaging way has given the gas storage division a new confidence in themselves: 'We have become so sure of ourselves that we go to [potential clients and collaborators] and say: "We believe we can do something together with you"' (Nielsen, 2014).

Engagement

In terms of engagement, we see that when strategic visualizations strike a balance of being thoroughly crafted and well prepared – in addition to being open for interpretation and further sketching – partners and customers feel engaged to develop and qualify the vision in a collaborative manner. Also, the case study showed that when working with templates, the participants extrapolated the process in a visual manner; in other words, they started thinking in images and templates as the method of moving forward.

The Role of Strategic Visualization as Design Vehicle in Multi-Stakeholder Initiatives

The findings of this article indicate that participants in this research case are able to jointly access, build, modify, shape and thus co-design solution scenarios by using strategic visualization as a design tool. In other words, strategic visualization provides a platform for co-designing solutions for both designers and non-designers. Thus, the role of design in co-creating shared business

models transforms the design *of* something and design *for* something to also enable co-design *with* others.

Moreover, further studies are currently being conducted to strengthen the knowledge of this design tool's role in co-creating multi-stakeholder shared business models.

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